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Date of mailing (day/month/year) 20 April 2000 (20.04.00)	
International application No. PCT/SE99/01213	**Applicant's or agent's file reference**
International filing date (day/month/year) 02 July 1999 (02.07.99)	**Priority date** (day/month/year) 03 July 1998 (03.07.98)
Applicant ANDERMO, Per-Göran et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

03 February 2000 (03.02.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

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PATENT COOPERATION TREATY

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NOTIFICATION CONCERNING SUBMISSION OR TRANSMITTAL OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

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S-203 14 Malmö
SUÈDE

Date of mailing (day/month/year) 08 September 1999 (08.09.99)	
Applicant's or agent's file reference	**IMPORTANT NOTIFICATION**
International application No. PCT/SE99/01213	International filing date (day/month/year) 02 July 1999 (02.07.99)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 03 July 1998 (03.07.98)
Applicant RADIO DESIGN INNOVATION TJ AB et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.

3. An **asterisk(*)** appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

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Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
03 July 1998 (03.07.98)	9802387-2	SE	09 Augu 1999 (09.08.99)

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
P10752-M/MÅ		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE99/01213	02.07.1999	03.07.1998
International Patent Classification (IPC) or national classification and IPC7		
H 04 Q 7/36, H 04 Q 7/38		
Applicant		
RADIO DESIGN INNOVATION TJ AB ET AL.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of ~~1~~ 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
03.02.2000	25.10.2000
Name and mailing address of the IPEA/SE	Authorized officer
Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 Telex 17978 PATOREG-S	Bo Gustavsson/AE Telephone No. 08-782 25 00

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE99/01213

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☐ the international application as originally filed.

☒ the description, pages 1-4, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☒ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. 1-21, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☒ the drawings, ~~sheets~~/fig _____, as originally filed,
~~sheets~~/fig _____, filed with the demand
~~sheets~~/fig _____, filed with the letter of _____,
~~sheets~~/fig 1, filed with the letter of 03.09.1999.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, ~~sheets~~/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

V. Resoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-21	YES
	Claims		NO
Inventive step (IS)	Claims	1-21	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims		NO

2. Citations and explanations

The invention relates to a method and an arrangement in a mobile telecommunication system using lobes for establishing and maintaining a radio channel between a mobile station and a base station. The object of the invention is to find the initial direction of a mobile terminal, to detect the initial signalling and to establish and maintain a connection between the mobile station and a base station. This is accomplished by connecting a transmitter of a base station to a wide lobe in a sector, connecting a receiver of a base station to narrow lobes in a sector through a fast scanning switch, measuring the signal strength received in each lobe during the increase of the power in the mobile station in the beginning of a frame, selecting the lobe having the highest received signal strength, connecting the receiver to the selected narrow lobe before frame data starts to be transmitted and connecting the transmitter from a wide to a narrow lobe.

Documents cited in the search report:

D1 WO 9744978 A1
D2 WO 9509490 A1
D3 WO 9750272 A2

D1 describes a method and a system in a radio system for selecting one or more of a plurality of antenna beams of a base station based on a quality measure of the signal received from a mobile terminal. During a call setup, the base station receives a signal from a mobile terminal on all antenna beams. Then, the quality of the connection on each beam is measured and the beam(s) having the best reception is selected for communication.

.../...

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box V

From D2, a method and an apparatus for transmitting and receiving signals in a base station with an antenna array is known. According to the method, the base station transmits signals to a mobile terminal using channels in a wide antenna lobe. After having determined the position of the mobile terminal, the base station selects a channel in a narrow antenna lobe. The switch from wide to narrow antenna lobe is made when the position of the mobile terminal is determined to a certain degree.

In D3, a multibeam antenna array for base stations is shown, wherein a channel follows a mobile terminal by reconfiguring the antenna beams. According to the invention described, an array of spaced beam-spots are radiated within a cell, each beam-spot having a plurality of channels, one of which is assigned to a mobile terminal. Signal strength of a received signal is measured and based thereon the base station radiates the communication channel to the mobile terminal to a selected number of beam-spots.

None of the cited documents show a method in which the selection of antenna lobe based on quality measure is made during power up of the mobile terminal. The invention according to the amended claims 1-21 therefore is new. The cited documents cannot be considered to lead a person skilled in the art to a solution according to the invention. The invention therefore shown inventive step. The invention also has industrial applicability.

CLAIMS

1. A method in a mobile telecommunication system using lobes for establishing a radio channel between a mobile station (MS) and a base station (BS), **characterized** by the steps of:

connecting the transmitter of the base station to a wide lobe in a sector;

connecting the receiver of the base station to narrow lobes in the sector through a fast scanning switch;

measuring the signal strength (RSS) received from the mobile station or signal quality in each lobe in the sector during the increase of the power in the mobile station in the beginning of the frame;

selecting the lobe with highest received signal strength (RSS) or signal quality;

connecting the receiver equipment of the base station (BS) to the selected narrow lobe before frame data starts to be transmitted; and

connecting the transmitter equipment of the base station (BS) from a wide to narrow lobe at a suitable point in the signalling scheme.

2. A method as claimed in claim 1, **characterized** in that the base station (BS) measures the received signal strength (RSS) or signal quality of the lobes in the sector simultaneously or sequentially.

3. A method as claimed in claims 1 or 2, **characterized** in that a direction finding unit (DFU) in the base station (BS) measures the received signal strength (RSS) or signal quality in each lobe in the sector, and stores the values of the received signal strength or signal quality for each lobe in a memory (RSSI-records).

4. A method as claimed in claim 3, **characterized** in that a base site controller (BSC) reads the values in the memory (RSSI-records) and decides which lobe has the highest received signal strength or signal quality selecting that lobe direction for communication with the mobile station.

5. A method as claimed in claim 4, **characterized** in that the base site controller (BSC) configures a lobe shaping unit (LSU) to establish a preferable lobe, e.g. narrower lobe, in the direction of the selected lobe towards the mobile station for the downlink and/or uplink respectively.

6. A method as claimed in anyone of the preceding claims, **characterized** in that it is used at call set up and/or at handover between sectors.

7. A method as claimed in anyone of the preceding claims, **characterized** in that lobes having different widths and gains in arbitrary directions both in the uplink and the downlink are formed by changing phase and amplitude coefficients.

8. A method as claimed in claim 7, **characterized** in that the base station (BS) transmits identification signals in a wide lobe to inform the mobile station (MS), which is covered by said wide lobe, about its existence.

9. A method in a mobile telecommunication system using lobes for measuring the signal quality of a radio channel between a mobile station (MS) and a base station (BS), **characterized** by the steps of:

connecting the receiver of the base station to narrow lobes in the sector through a fast scanning switch;

measuring the signal strength (RSS) received from the mobile station or signal quality in each narrow lobe in the sector;

selecting the lobe with highest received signal strength (RSS) or signal quality;

connecting a signal quality receiver unit (SR) to the selected narrow lobe.

10. A method as claimed in claim 9, **characterized** in that the signal quality receiver unit (SR) performs signal strength measurements or Φ tone measurements in this selected lobe for handover purposes.

11. A method as claimed in claim 10, **characterized** in that the base station (BS) monitors the received signal and continuously connects the best lobe to the signal quality receiver unit (SR).

12. A method as claimed in claim 9, 10 or 11, **characterized** in that the base station (BS) measures the received signal strength (RSS) or signal quality of narrow lobes in the sector simultaneously or sequentially.

13. A method as claimed in any one of claims 9 - 12, **characterized** in that a direction finding unit (DFU) in the base station (BS) measures the received signal strength (RSS) or signal quality in each lobe in the sector, and stores the values of the received signal strength or signal quality for each lobe in a memory (RSSI-records).

14. A method as claimed in claim 13, **characterized** in that a base site controller (BSC) reads the values in the memory (RSSI-records) and decides which lobe has the highest received signal strength or signal quality selecting that lobe direction for communication with the mobile station.

15. A method as claimed in claim 14, **characterized** in that the base site controller (BSC) configures a lobe shaping unit (LSU) to establish a preferable lobe, e.g. narrower lobe, in the direction of the selected lobe towards the mobile station for the downlink and/or uplink respectively.

16. A method as claimed in any one of claims 9 - 15, **characterized** in that lobes having different widths and gains in arbitrary directions both in the uplink and the downlink are formed by changing phase and amplitude coefficients.

17. An arrangement in a mobile telecommunication system using lobes for establishing a radio channel between a mobile station (MS) and a base station (BS), **characterized** in that a lobe shaping unit is arranged to connect the transmitter of the base station to a wide lobe in a sector and to connect the receiver of the base

station to narrow lobes in the sector through a fast scanning switch, in that a direction finding unit (DFU) in the base station (BS) is arranged to measure the signal strength (RSS) received from the mobile station or signal quality in each lobe in the sector during the increase of the power in the mobile station, to select the lobe with highest received signal strength (RSS) or signal quality, to connect the receiver part of an arbitrary TRX-equipment of the base station (BS) to the selected narrow lobe before frame data starts to be transmitted and to connect the transmitter part of an arbitrary TRX-equipment of the base station (BS) from a wide lobe to the narrow lobe using the selected narrow lobe at a suitable point in the signalling scheme.

18. An arrangement in a mobile telecommunication system using lobes for measuring the signal quality of a radio channel between a mobile station (MS) and a base station (BS), **characterized** in that a lobe shaping unit is arranged to connect the receiver of the base station to narrow lobes in the sector through a fast scanning switch, in that a direction finding unit (DFU) in the base station (BS) is arranged to measure the signal strength (RSS) received from the mobile station or signal quality in each lobe in the sector, to select the lobe with highest received signal strength (RSS) or signal quality, and to connect a signal quality receiver unit (SR) to the selected narrow lobe.

19. An arrangement as claimed in claim 17 or 18, **characterized** in that the direction finding unit includes a RSSI-record, RSSI-unit and said fast scanning switch.

20. An arrangement as claimed in claim 19, **characterized** in that the DFU reads RSSI and keeps a RSSI-record for each lobe.

21. An arrangement as claimed in claims 19 or 20, **characterized** in that the base station controller (BSC) reads the RSSI-record of the direction finding unit (DFU) and continuously connects the best lobe to the receiver.

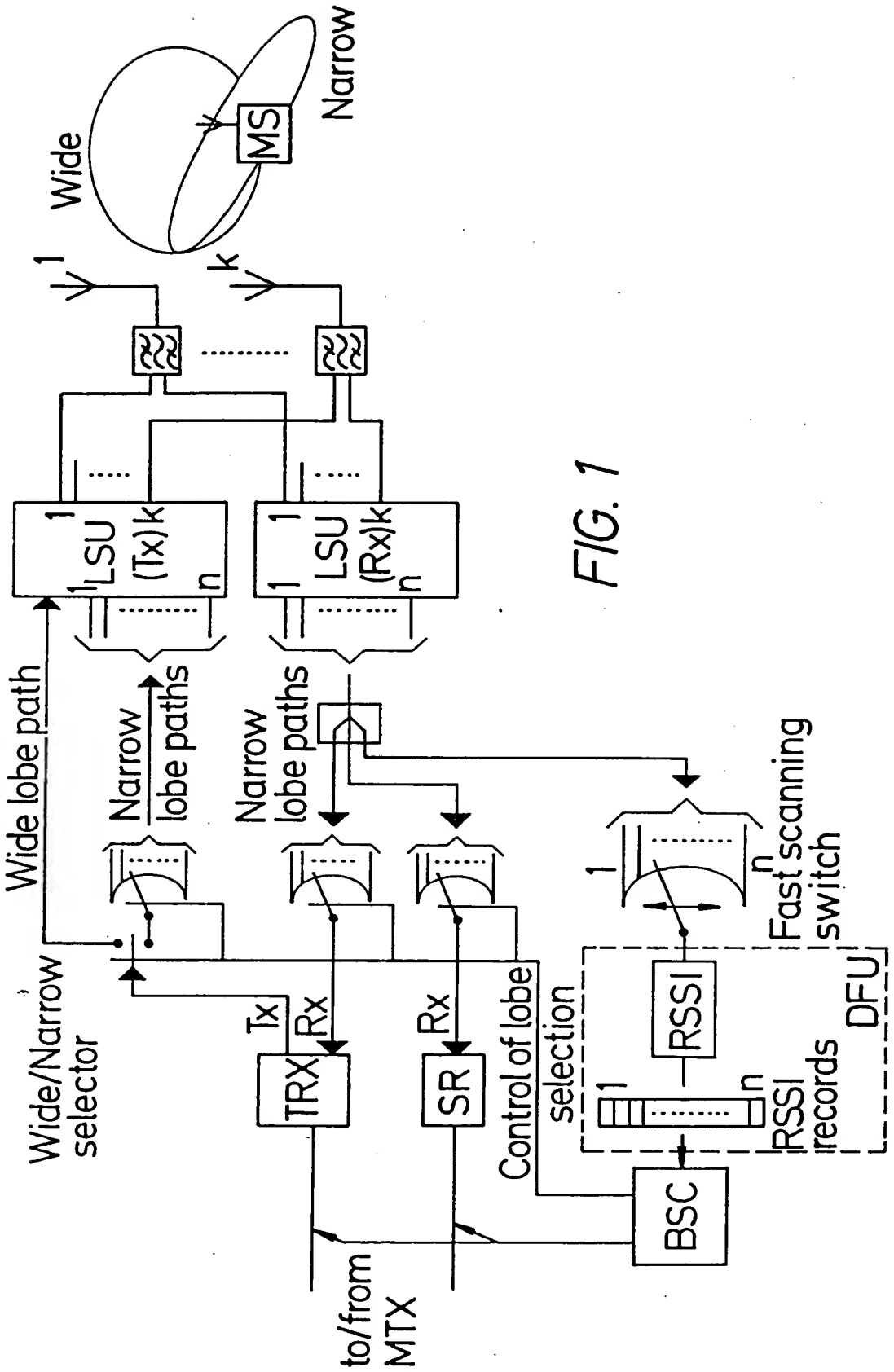

FIG. 1

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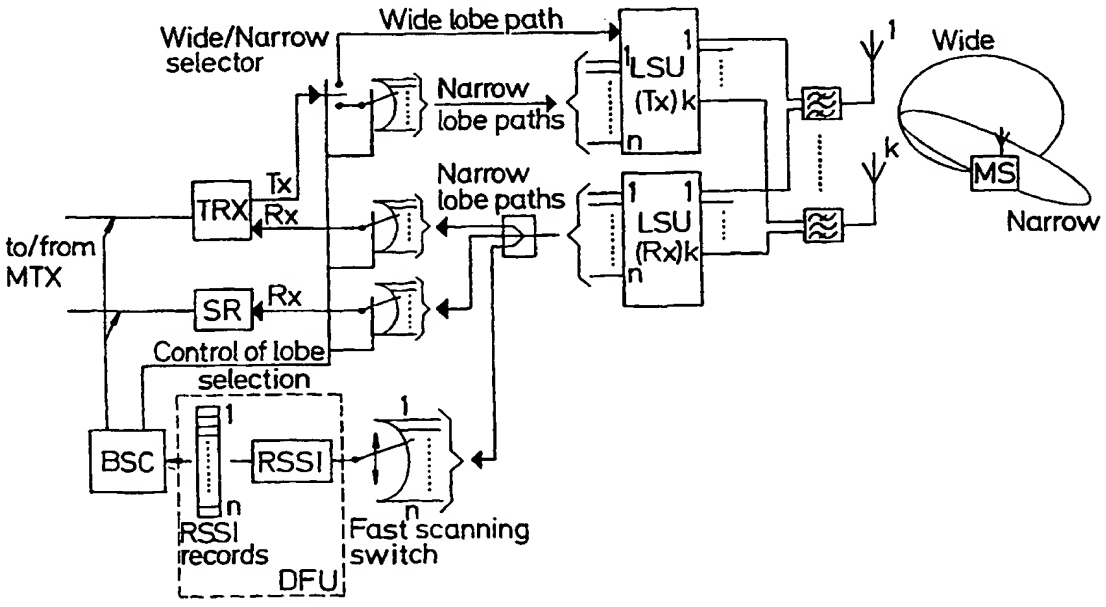

(57) Abstract

The invention relates to a method and an arrangement in a mobile telecommunication system using lobes for establishing and maintaining a radio channel between a mobile station and a base station. The base station measures received signal strength or signal quality in each lobe in a sector by means of a Direction Finding Unit (DFU). The DFU selects the lobe with the highest received signal strength or signal quality and connects the transceiver equipment of the base station to the mobile station using the selected lobe.

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MOBILE TELECOMMUNICATION SYSTEM

Field of the invention

The present invention relates to a method and an arrangement in a mobile telecommunication system using lobes for establishing and maintaining a radio channel between a mobile station (MS) and a base station (BS).

Background of the invention

In a cellular system with a phased array antenna system narrow lobes are generated by a lobe shaping unit (LSU). These narrow lobes are directed towards mobile stations.

At call set up the direction of a mobile station within a sector is unknown. Narrow lobes cannot be established until the direction is known. The invention gives a solution on how to find both the initial direction of the mobile terminal and to detect the initial signalling. An algorithm is also described how to change from a wide lobe to a narrow lobe during call set up.

A similar problem exists when a handover is carried out between sectors or base sites.

A similar method is used for signal strength measurements.

Summary of the invention

Thus, the object of the invention is to find the initial direction of a mobile terminal, detect the initial signalling, establish and maintain a connection between the base station and the mobile station.

This object is achieved by means of a method and an arrangement according to claims 1 and 9, respectively.

Other characteristics of the invention are set out in the dependent claims.

Brief description of the drawing

A preferred embodiment of the invention will now be given below with reference to the only drawing:

Figure 1 discloses the construction of the lobe shaping system including the Direction Finding Unit according to the invention.

Detailed description of an embodiment of the invention

In the following description certain abbreviations are used throughout the text. First these abbreviations will be explained, after which the invention will be described with reference to Figure 1.

DFU	Direction Finding Unit
MS	Mobile Station
MTX	Mobile Telephone Exchange
BSC	Base Site Controller for control of LSU and DFU
BS	Base Station
TRX	Transceiver Equipment (Transmitter/Receiver Equipment)
CC	Calling Channel
TCfree	free Traffic Channel
TCho	Traffic Channel receiving handover from another channel
RSS	Radio Signal Strength
RSSI	Radio Signal Strength Indicator
LSU	Lobe Shaping Unit
SSM	Signal Strength Measurement
SR	Signal Strength Receiver or TRX used for signal strength measurements

In addition to conventional equipment as for example transmitter/receiver equipment (TRX), antenna means, control means for establishing channels, means for measuring signal strength connected to supervising means for handover decisions, the base station (BS) of the present invention also includes a Direction Finding Unit (DFU) and lobe shaping units (LSU). The RSSI-records, RSSI and fast scanning switch of figure 1 constitute the DFU. The MTX constitutes the interface to the fixed public or private network, e.g. POTS, ISDN. The MTX is considered to be the most complex part of the mobile communication system, and all final decisions regarding handover, roaming, call set up etc. emanates from the MTX. The TRX is connected to a lobe shaping unit (LSU) which in turn is connected to an antenna array. The lobe shaping unit (LSU) is arranged to form lobes with different widths and gains in arbitrary directions in both uplink and downlink by altering phase- and amplitude coefficients. The lobe shaping unit is described in detail in pending patent applications, assigned to Radio Design Innovation TJ AB, which applications are incorporated herein by reference.

Now, returning to the DFU its responsibility resides in the localisation of a mobile station (MS) as fast as possible in order to avoid that the signalling between the MTX and the MS is lost. This function is particularly required during a call set-up or in handover situations when the position of the MS initially is unknown to the BSC. The above localisation is achieved by allocating narrow antenna lobes (using LSU and an antenna array) covering the whole area inside a sector. The DFU simultaneously or preferably sequentially scans all receiving lobes. Upon detection of received signal strength in one or a multitude of the receiving lobes the

lobe with highest signal strength is selected and the BSC establishes a configured lobe in the direction of the selected lobe for communication between the MS and a TRX. It should of course be realised that the MS, before sending signals to the BS, must identify the BS. This is achieved by the BS transmitting identification signals in a wide lobe in order to inform MS, covered by said wide lobe, about its existence.

A function procedure scheme for the DFU is described below.

1. Upon receiving a CC, TCfree or TCho activation order (MTX sends order to a TRX-unit), the BSC activates the DFU. A wide lobe in the LSU is connected to the transmitter for the down link contact (paging) with the mobile station MS. The DFU is set to correct channel number and monitors the received signal in the uplink in narrow lobes.

2. The MS activates its transmitter as response to the paging to set up a MS initiated call on a new frequency after e.g. a handover order. Power starts to ramp up and before frame data is transmitted, the DFU must have identified the lobe with strongest RF-level. By scanning through the narrow lobes, the DFU will find the lobe with the strongest received signal strength. This narrow lobe is selected. The BSC sets up a path through the equipment with the selected lobe connected to the receiver.

3. During the reception of NMT-frames the DFU measures RSS and keeps a record of each lobe. The BSC reads the RSSI records from the DFU and connects continuously the best lobe to the receiver.

4. At a suitable point in the signalling scheme the BSC reads the RSSI record from the DFU and decides which lobe is best to use for transmitter part and connects the best lobe in that direction to the transmitter, i.e. the down-link wide lobe is transformed into a narrow lobe.

5. During the signalling and speech conversion, the DFU measures RSSI and the BSC continuously connects the best lobe to receiver and transmitter.

In other words, the mobile station is paged using a wide lobe in the down link, but the base station listens in the up link using narrow lobes scanned through possible directions. By narrowing the up-link lobe from e.g. 60° to 10-18°, typically 15°, the antenna gain in the base station increases a factor of approx. 4-5 (6-7 dB). This means that the output power of the mobile station may be lowered accordingly which is a great advantage because of the limited battery power available. On the other hand, the base station may transmit in the down link with

sufficient power in a wide lobe during call set-up or handover etc.,since the base station is not so sensitive with respect to the power consumption.

A similar method as above is used for signal strength measurements. The responsibility for the SSM function is to connect a SR unit (or channel unit) to the best lobe so that signal strength measurements can be performed by the SR unit, on the best lobe. The RSSI measurements are initiated from the MTX.

The SSM function uses the same hardware configuration as the DFU function.

A function scheme for the SSM function is described below.

1. Upon receiving a measurement activation order (MTX sends order to a TRX or SR unit), the BSC activates the DFU and the DFU is set to correct channel number and monitors the received signal.

2. The DFU identifies the lobe with the strongest RF-level. The BSC sets up a path through the equipment with the selected lobe connected to the SR.

3. SR performs RSSI and Φ tone measurements. In for example Nordic Mobile Telephone (NMT) quality of a call is controlled by a control signal (Φ tone) i.e. one of four tones around 4kHz. The base station transmits the Φ signal to the mobile station which returns the signal to the base station. The quality of the returned Φ signal is measured in the base station and if the quality is below a predetermined value the base station transmits an alarm to an MTX. Then, the MTX orders the base station and surrounding base stations to measure the strength of the radio signal from the mobile station. The base stations send the measurement results to the MTX, after which the MTX connects the call to the base station with highest received signal strength.

4. The DFU monitors the received signal and the BSC continuously connects the best lobe to the SR. After the RX is ready BSC disconnects SR equipment.

It would be appreciated by those of ordinary skill in the art that the present invention can be embodied in other specific forms without departing from the spirit or essential character thereof. The presently disclosed embodiments are therefore considered in all respects to be illustrative and not restrictive. The scope of the inventions indicated by the appended claims rather than the foregoing description, and all changes which come within the meaning and range of equivalence thereof are intended to be embraced therein.

CLAIMS

1. A method in a mobile telecommunication system using lobes for establishing and maintaining a radio channel between a mobile station (MS) and a base station (BS), **characterized** by the steps of:

measuring received signal strength (RSS) or signal quality in each lobe in a sector;

selecting the lobe with highest received signal strength (RSS) or signal quality;

connecting the transceiver equipment of the base station (BS) to the mobile station (MS) using the selected lobe.

2. A method as claimed in claim 1, **characterized** in that the base station (BS) measures the received signal strength (RSS) or signal quality of the lobes in the sector sequentially.

3. A method as claimed in claims 1 or 2, **characterized** in that a DFU in the base station (BS) measures the received signal strength (RSS) or signal quality in each lobe in the sector, and stores the values of the received signal strength or signal quality for each lobe in a memory (RSSI-records).

4. A method as claimed in claim 3, **characterized** in that a base site controller (BSC) reads the values in the memory (RSSI-records) and decides which lobe has the highest received signal strength or signal quality selecting that lobe direction for communication with the mobile station.

5. A method as claimed in claim 4, **characterized** in that the base site controller (BSC) configures a lobe shaping unit (LSU) to establish a preferable lobe, e.g. narrower lobe, in the direction of the selected lobe towards the mobile station for the downlink and/or uplink respectively.

6. A method as claimed in claim 5, **characterized** in that the base site controller (BSC) allocates a traffic channel (TC) between a transmitter/receiver equipment (TRX) in the base station and the lobe shaping unit (LSU), wherein the traffic channel is established between the base station (BS) and the mobile station (MS).

7. A method as claimed in any preceding claims **characterized** in that it is used at call set up and/or at handover between sectors.

8. A method as claimed inclaim7, **characterized** in that a SSM (Signal strength measurement)-equipment in the base station connects a SR (signal strength receiver)-unit to the selected lobe with highest received signal strength (RSS) or signal quality, wherein the SR-unit performs signal strength measurements or Φ tone measurements in this selected lobe for handover purposes.

9. An arrangement in a mobile telecommunication system using lobes for establishing and maintaining a radio channel between a mobile station (MS) and a base station (BS), **characterized** in that a Direction Finding Unit (DFU) in the

base station (BS) is arranged to measure the received signal strength (RSS) or signal quality in each lobe, select the lobe with highest received signal strength or signal quality, and connect this lobe to an arbitrary TRX-equipment in the base station (BS).

10. An arrangement as claimed in claim 9, **characterized** in that the DFU includes a RSSI-record, RSSI-unit and a fast scanning switch.

11. An arrangement as claimed in claim 10, **characterized** in that the DFU reads RSSI and keeps a RSSI-record for each lobe.

12. An arrangement as claimed in claims 10 or 11, **characterized** in that the BSC reads the RSSI-record of the DFU and connects continuously the best lobe to the receiver (SR).

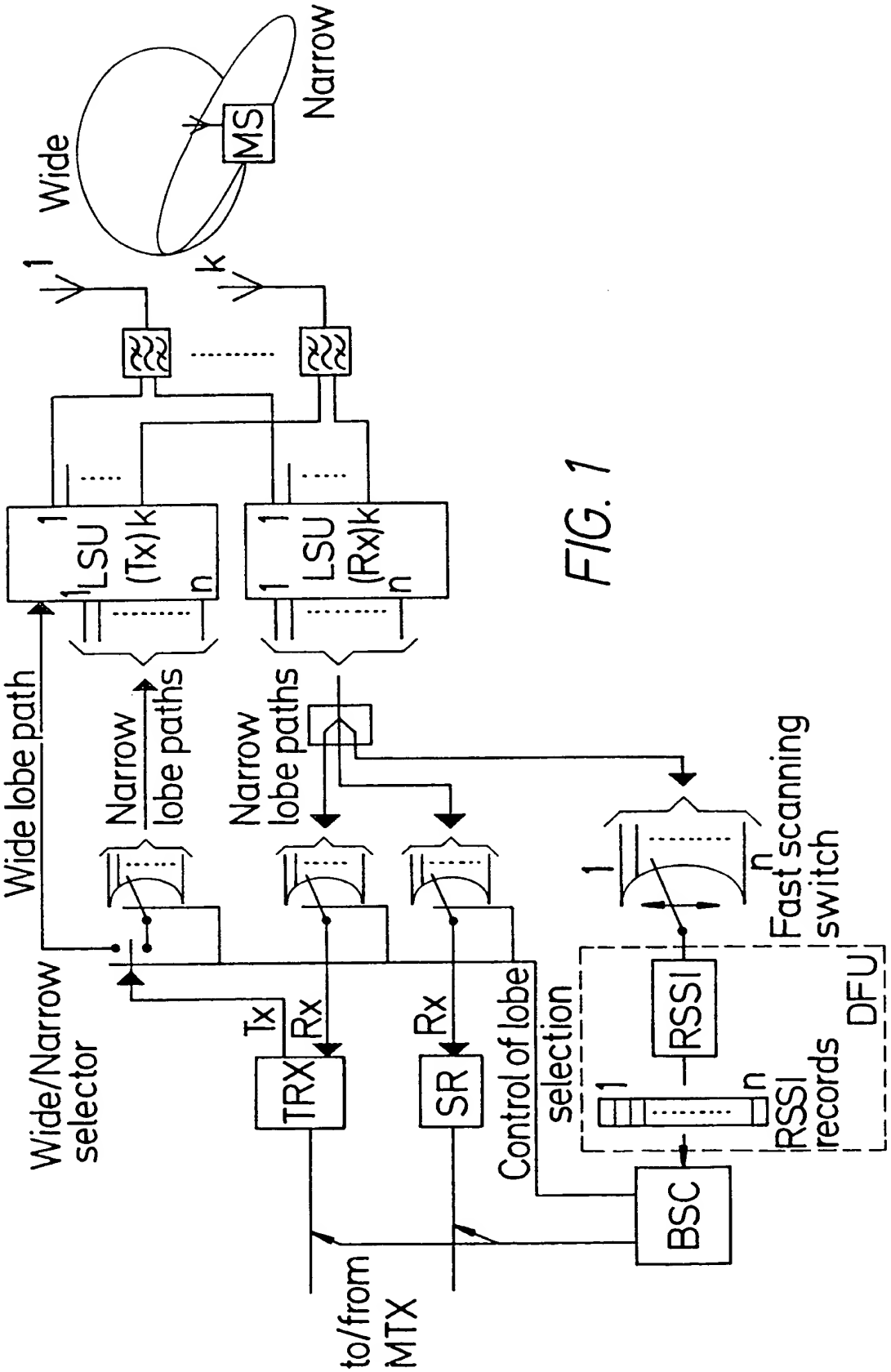
Wide
Narrow
MS
1
k
LSU (Tx)k
LSU (Rx)k
1
n
Wide lobe path
Narrow lobe paths
Narrow lobe paths
Fast scanning switch
Wide/Narrow selector
Tx
Rx
Rx
TRX
SR
Control of lobe selection
RSSI
RSSI records
DFU
BSC
to/from MTX

FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/01213

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/36, H04Q 7/38
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9744978 A1 (NOKIA TELECOMMUNICATIONS OY), 27 November 1997 (27.11.97), page 7, line 17 - page 9, line 36	1-4,7-12
Y		5,6
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X	WO 9509490 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 6 April 1995 (06.04.95), page 3, line 12 - line 30; page 5, line 25 - page 10, line 17	1,7-9
Y		5,6
A		2-4,10-12
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw douhts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 November 1999	24 -11- 1999
Name and mailing address of the ISA/	Authorized officer
Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Bo Gustavsson/mj Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/01213

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	--	2-8,10-12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/SE 99/01213

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